

WHAT IS CLAIMED IS:

- 1 1. A method for generating user interface output on an output device attached  
2 to a remote computer, wherein the remote computer communicates over a network to at  
3 least one server, comprising:  
4 receiving an object including user interface components and data from one server;  
5 generating user interface output from the user interface components and data in  
6 the object;  
7 receiving a standard application program interfaces (API) that are a member of a  
8 set of standard APIs in a first format from at least one server over the network;  
9 converting the standard APIs in the first format to a user interface API in a second  
10 format; and  
11 executing the user interface API in the second format to manipulate the object and  
12 generate further user interface output from the components and data in the object.
- 1 2. The method of claim 1, wherein the data included in the object includes at  
2 least one of text, images, and graphics.
- 1 3. The method of claim 1, further comprising:  
2 receiving user input commands at the remote computer;  
3 generating user interface APIs in the second format to implement the user input  
4 commands; and  
5 executing the generated user interface APIs to manipulate the object and generate  
6 further user interface output from the components and data in the object.
- 1 4. The method of claim 1, wherein the user interface output generates a web  
2 browser interface.

1           5.       The method of claim 1, wherein the object comprises a document object  
2 model (DOM) object and the standard APIs in the first format comprise W3C APIs.

1           6.       A method for controlling from a server user interface output on an output  
2 device attached to a remote computer, wherein the server and remote computer  
3 communicate over a network, comprising:  
4           transmitting from the server an object to the remote computer including user  
5 interface components and data, wherein the remote computer generates user interface  
6 output from the user interface components and data in the object; and  
7           transmitting from the server to the remote computer standard application program  
8 interfaces (API) that are a member of a set of standard APIs in a first format, wherein the  
9 remote computer converts the standard APIs in the first format to user interface APIs in a  
10 second format to manipulate the object and generate further user interface output from the  
11 components and data in the object.

1           7.       The method of claim 6, further comprising:  
2           generating a user interface at the server from a copy of the object transmitted to  
3 the remote computer;  
4           receiving input to control the user interface at the server;  
5           generating standard APIs in the first format to control the user interface according  
6 to the received input; and  
7           transmitting the generated standard APIs in the first format to the remote  
8 computer to control the user interface output generated at the remote computer.

1           8.       The method of claim 7, wherein the object includes images of a product,  
2 wherein the received input at the computer is to modify the presentation of the images of  
3 the product, and wherein the generated and transmitted standard APIs modify the

4 presentation of the images of the product displayed in the generated user interface output  
5 at the remote computer.

1 9. The method of claim 6, further comprising:  
2 transmitting the object to additional remote computers;  
3 transmitting the standard APIs in the first format to the additional remote  
4 computers that received the object to manipulate the objects on all the remote computers  
5 and control the generation of user interface output on the remote computers.

1 10. The method of claim 9, further comprising:  
2 receiving, at the server, input from one of the remote computers to manipulate the  
3 object to modify the user interface output;  
4 generating, with the server, standard APIs to implement the manipulations to the  
5 object indicated in the received input; and  
6 transmitting the generated standard APIs to the remote computers to implement  
7 the manipulations of the object on the remote computers.

1 11. The method of claim 9, wherein the object includes components and data  
2 of an interactive lesson, wherein the lesson is presented by transmitting standard APIs to  
3 the remote computers to generate user interface output defining the lesson from the  
4 components and data in the object at each remote computer.

1 12. The method of claim 6, wherein the data included in the object includes at  
2 least one of text, images, and graphics.

1 13. The method of claim 6, wherein the user interface output generates a web  
2 browser interface.

1        14.    The method of claim 6, wherein the object comprises a document object  
2 model (DOM) object and the standard APIs in the first format comprise W3C APIs.

1        15.    A system for generating user interface output, comprising:  
2        a remote computer;  
3        an output device attached to the remote computer;  
4        a network, wherein the remote computer communicates over the network to at  
5        least one server;  
6        program logic executed in the remote computer, wherein the program logic  
7        includes code capable of causing the remote computer to perform:  
8            (i) receiving an object including user interface components and data from  
9            one server;  
10          (ii) generating user interface output from the user interface components  
11          and data in the object;  
12          (iii) receiving a standard application program interfaces (API) that are a  
13          member of a set of standard APIs in a first format from at least one server over the  
14          network;  
15          (iv) converting the standard APIs in the first format to a user interface API  
16          in a second format; and  
17          (v) executing the user interface API in the second format to manipulate the  
18          object and generate further user interface output from the components and data in  
19          the object.

1        16.    The system of claim 15, wherein the data included in the object includes at  
2        least one of text, images, and graphics.

1        17.    The system of claim 15, wherein the program logic code is further capable  
2 of causing the remote computer to perform:  
3        receiving user input commands at the remote computer;  
4        generating user interface APIs in the second format to implement the user input  
5 commands; and  
6        executing the generated user interface APIs to manipulate the object and generate  
7 further user interface output from the components and data in the object.

1        18.    The system of claim 15, wherein the user interface output generates a web  
2 browser interface.

1        19.    The system of claim 15, wherein the object comprises a document object  
2 model (DOM) object and the standard APIs in the first format comprise W3C APIs.

1        20.    A system for controlling user interface output on an output device attached  
2 to a remote computer, comprising:  
3        a server;  
4        a network, wherein the server communicates with the remote computer over the  
5 network;  
6        program logic executed in the server, wherein the program logic includes code  
7 capable of causing the server to perform:

8            (i) transmitting an object to the remote computer including user interface  
9 components and data, wherein the remote computer generates user interface  
10 output from the user interface components and data in the object; and  
11            (ii) transmitting to the remote computer standard application program  
12 interfaces (API) that are a member of a set of standard APIs in a first format,  
13 wherein the remote computer converts the standard APIs in the first format to user

14 interface APIs in a second format to manipulate the object and generate further  
15 user interface output from the components and data in the object.

1 21. The system of claim 20, wherein the program logic code is further capable  
2 of causing the server to perform:

3 generating a user interface at the server from a copy of the object transmitted to  
4 the remote computer;

5 receiving input to control the user interface at the server;

6 generating standard APIs in the first format to control the user interface according  
7 to the received input; and

8 transmitting the generated standard APIs in the first format to the remote  
9 computer to control the user interface output generated at the remote computer.

1 22. The system of claim 21, wherein the object includes images of a product,  
2 wherein the received input at the computer is to modify the presentation of the images of  
3 the product, and wherein the generated and transmitted standard APIs modify the  
4 presentation of the images of the product displayed in the generated user interface output  
5 at the remote computer.

1 23. The system of claim 20, wherein the program logic code is further capable  
2 of causing the server to perform:

3 transmitting the object to additional remote computers;

4 transmitting the standard APIs in the first format to the additional remote  
5 computers that received the object to manipulate the objects on all the remote computers  
6 and control the generation of user interface output on the remote computers.

1        24.    The system of claim 23, wherein the program logic code is further capable  
2 of causing the server to perform:  
3        receiving input from one of the remote computers to manipulate the object to  
4 modify the user interface output;  
5        generating standard APIs to implement the manipulations to the object indicated  
6 in the received input; and  
7        transmitting the generated standard APIs to the remote computers to implement  
8 the manipulations of the object on the remote computers.

1        25.    The system of claim 23, wherein the object includes components and data  
2 of an interactive lesson, wherein the lesson is presented by transmitting standard APIs to  
3 the remote computers to generate user interface output defining the lesson from the  
4 components and data in the object at each remote computer.

1        26.    The system of claim 20, wherein the data included in the object includes at  
2 least one of text, images, and graphics.

1        27.    The system of claim 20, wherein the user interface output generates a web  
2 browser interface.

1        28.    The system of claim 20, wherein the object comprises a document object  
2 model (DOM) object and the standard APIs in the first format comprise W3C APIs.

1        29.    A program for use in generating user interface output on an output device  
2 attached to a remote computer, wherein the remote computer communicates over a  
3 network to at least one server, and wherein the program is embedded in a computer  
4 readable medium and includes code capable of causing the remote computer to perform:  
5        receiving an object including user interface components and data from one server;

6 generating user interface output from the user interface components and data in  
7 the object;  
8 receiving a standard application program interfaces (API) that are a member of a  
9 set of standard APIs in a first format from at least one server over the network;  
10 converting the standard APIs in the first format to a user interface API in a second  
11 format; and  
12 executing the user interface API in the second format to manipulate the object and  
13 generate further user interface output from the components and data in the object.

1 30. The program of claim 29, wherein the data included in the object includes  
2 at least one of text, images, and graphics.

1 31. The program of claim 29, wherein the program code is further capable of  
2 causing the remote computer to perform:  
3 receiving user input commands at the remote computer;  
4 generating user interface APIs in the second format to implement the user input  
5 commands; and  
6 executing the generated user interface APIs to manipulate the object and generate  
7 further user interface output from the components and data in the object.

1 32. The program of claim 29, wherein the user interface output generates a  
2 web browser interface.

1 33. The program of claim 29, wherein the object comprises a document object  
2 model (DOM) object and the standard APIs in the first format comprise W3C APIs.

1 34. A program for controlling a server to generate user interface output on an  
2 output device attached to a remote computer, wherein the server and remote computer



3 communicate over a network, and wherein the program is embedded in a computer  
4 readable medium and includes code capable of causing the server to perform:  
5 transmitting an object to the remote computer including user interface components  
6 and data, wherein the remote computer generates user interface output from the user  
7 interface components and data in the object; and  
8 transmitting to the remote computer standard application program interfaces (API)  
9 that are a member of a set of standard APIs in a first format, wherein the remote computer  
10 converts the standard APIs in the first format to user interface APIs in a second format to  
11 manipulate the object and generate further user interface output from the components and  
12 data in the object.

1 35. The program of claim 34, wherein the program code is further capable of  
2 causing the server to perform:  
3 generating a user interface at the server from a copy of the object transmitted to  
4 the remote computer;  
5 receiving input to control the user interface at the server;  
6 generating standard APIs in the first format to control the user interface according  
7 to the received input; and  
8 transmitting the generated standard APIs in the first format to the remote  
9 computer to control the user interface output generated at the remote computer.

1 36. The program of claim 35, wherein the object includes images of a product,  
2 wherein the received input at the computer is to modify the presentation of the images of  
3 the product, and wherein the generated and transmitted standard APIs modify the  
4 presentation of the images of the product displayed in the generated user interface output  
5 at the remote computer.

1           37.    The program of claim 34, wherein the program code is further capable of  
2 causing the server to perform:  
3           transmitting the object to additional remote computers;  
4           transmitting the standard APIs in the first format to the additional remote  
5 computers that received the object to manipulate the objects on all the remote computers  
6 and control the generation of user interface output on the remote computers.

1           38.    The program of claim 37, wherein the program code is further capable of  
2 causing the server to perform:  
3           receiving input from one of the remote computers to manipulate the object to  
4 modify the user interface output;  
5           generating standard APIs to implement the manipulations to the object indicated  
6 in the received input; and  
7           transmitting the generated standard APIs to the remote computers to implement  
8 the manipulations of the object on the remote computers.

1           39.    The program of claim 37, wherein the object includes components and  
2 data of an interactive lesson, wherein the lesson is presented by transmitting standard  
3 APIs to the remote computers to generate user interface output defining the lesson from  
4 the components and data in the object at each remote computer.

1           40.    The program of claim 34, wherein the data included in the object includes  
2 at least one of text, images, and graphics.

1           41.    The program of claim 34, wherein the user interface output generates a  
2 web browser interface.

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